

REMARKS

Claims 1-4, 6 and 7 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,798,529 to Wagner ("Wagner"). Claim 5 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Wagner in view of U.S. Patent No. 5,766,379 to Lanford et al. ("Lanford"). Claims 8-12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lanford. Claim 13 is new.

Applicants request reconsideration and submit that the pending Claims 1-13 are patentable for the reasons that follow.

Claims 1-4, 6 and 7 are not anticipated by Wagner

The Action takes the position that Claims 1-4, 6 and 7 are "nearly duplicates" of certain claims in Wagner and are therefore anticipated. Applicants respectfully disagree.

Claim 1 recites, "a discharge device which introduces an organic chloride toward said semiconductor device." The introduction of the organic chloride can increase Focused Ion Beam Micromachining (FIBM) selectivity and reduce FIBM induced topography. *See*, Specification, page 11, lines 3-7. Wagner makes no reference to organic chloride. Wagner discusses using a discharge device to introduce an etch-enhancing material toward the semiconductor device. However, the only etch-enhancing materials discussed in Wagner are water vapor or hydrogen peroxide gas or a combination thereof. *See*, Wagner, col. 3, lines 57-62. Therefore, Wagner does not disclose all of the recitations of Claim 1, which is required for a § 102 rejection.

For these reasons, Applicants submit that Wagner does not teach or suggest all of the recitations of Claim 1 and request that the rejection of Claims 1-4, 6 and 7 be withdrawn. Claims 5 and 13 are dependent on Claim 1, and, thus, allowance of Claims 1-7 and 13 is respectfully requested.

Claim 5 is patentable over Wagner and Lanford

Claim 5 is dependent on Claim 1 and is patentable for the reasons discussed above. Claim 5 is also patentable for these additional reasons.

Wagner contains no teaching or suggestion to a skilled artisan that a discharge device that introduces an organic chloride could be used. As noted above, the only etch-enhancing materials proposed in Wagner are water vapor and hydrogen peroxide gas, and Wagner does not suggest any alternative materials. The only teaching or suggestion to use organic chloride is Applicants' specification. The Action cites Lanford as teaching a copper layer, and Lanford does not cure the deficiencies of Wagner. Therefore, Claim 5 is patentable for at least these additional reasons.

New Claim 13 is patentable

Claim 13 depends from Claim 1 and is patentable for at least the reasons discussed above with respect to Claims 1-7. In addition, Claim 13 is separately patentable for the following reasons.

Claim 13 recites as follows: "the discharge device comprises an organic chloride reservoir that contains an organic chloride." Support for Claim 13 is found, for example, on page 9, line 27 – page 10, line 5 of the Specification. As discussed above, the discharge device of Wagner introduces water vapor or hydrogen peroxide gas. Therefore, Wagner does not teach or suggest an organic chloride reservoir that contains an organic chloride, and new Claim 13 is patentable for at least these additional reasons.

Claims 8-12 are patentable over Lanford

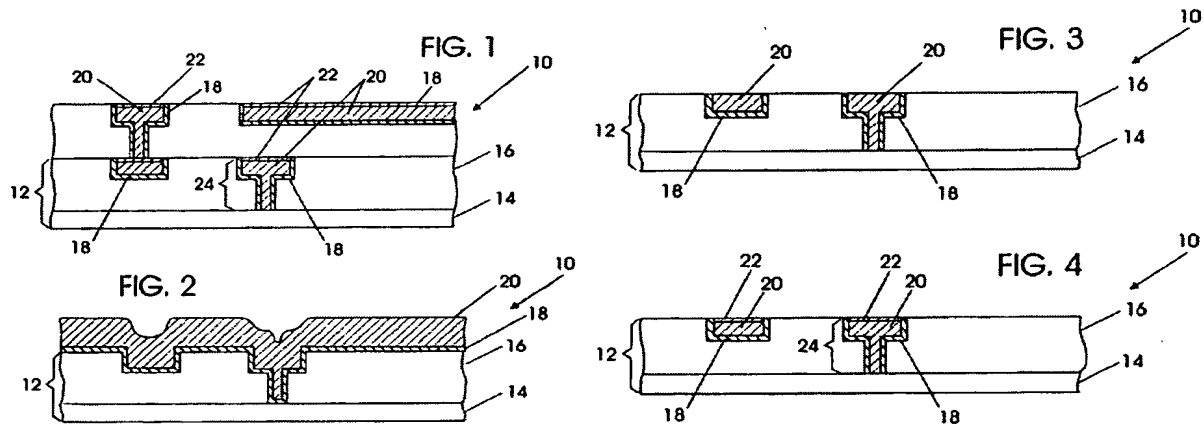
Claim 8 recites as follows (with emphasis added):

A microelectronic device comprising a copper layer on a substrate, said copper layer having an opening formed therein, said opening having a side wall and said opening exposing a surface portion of said substrate, said surface portion having surface topography less than 30% relative to the thickness of the copper material removed, and said side wall having a slope not greater than 10 degrees from vertical.

The Action states that Lanford teaches a copper layer having an opening formed therein that exposes a surface portion of the substrate at column 4, lines 26-61. Applicants respectfully disagree. Lanford discusses a metal layer 18, a copper layer 20, and a metal

oxide layer 22 on a substrate 12. As illustrated in **Figures 2-4** (reproduced below), the copper layer 20 is deposited on the metal layer 18 (**Figure 2**). Col. 5, lines 3-8. The copper layer 20 is planarized in **Figure 3** (col. 5, lines 9-14) and the metal layer 18 and the copper layer 20 are annealed in **Figure 4** (col. 5, lines 45-47).

As clearly shown in **Figures 1-4** of Lanford, the copper layer 20 is deposited such that it fills openings in the substrate. In contrast, Claim 8 recites that the copper layer has an opening formed therein that exposes a surface portion of the substrate. Therefore, Lanford does not teach or suggest a copper layer having an opening that exposes a surface portion of the substrate as recited in Claim 8.



Accordingly, Claims 8-12 are patentable over Lanford, and Applicants request that the rejection based on § 103 be withdrawn.

Conclusion

Accordingly, Applicants submit that the present application is in condition for allowance and the same is earnestly solicited. Should the Examiner have any formal matters outstanding of resolution, he is encouraged to telephone the undersigned at 919-854-1400 for expeditious handling.

Respectfully submitted,

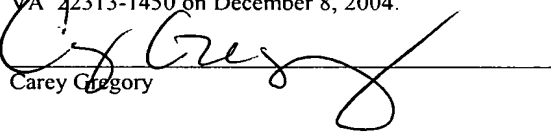
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